A POLICY PAPER ON OFFSHORE WIND ENERGY AS A NET POSITIVE FOR THE TOURISM INDUSTRY OF NEW JERSEY

by
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A capstone submitted to Johns Hopkins University in conformity with the requirements for the degree of Master of Science in Energy Policy and Climate

Baltimore, Maryland
May 2020

Abstract

As offshore wind becomes more economically viable off the east coast of the United States, the push to develop this resource becomes greater in order to decrease our carbon dioxide emissions. In many coastal states and in Washington DC, the political will is such that large offshore wind projects are moving forward at a relatively rapid pace after stalling for several years. New Jersey is no exception. An open solicitation window for 1200 to 2400 MW of offshore wind energy along with the approval of a strategic plan for Governor Phil Murphy’s goal of 7500 MW of offshore wind energy in New Jersey by 2035, has made the prospects of large wind installations quite real for this tourism-dependent state. One large project (Ørsted’s proposed Ocean Wind installation) is already in advanced stages of planning, which has brought offshore development into the public conscience. The focus of this paper is on projecting the impact that offshore wind installations will have on New Jersey’s tourism industry. In addition, it looks at how public opinion might shift from pre-construction to post construction. Based on these results, policy recommendations on how to maximize tourism benefits were made. The focus of the analysis is on two operational facilities: Rampion Offshore Wind Farm (UK) and Block Island Wind Farm (US). In both these locations, it was found that the installations had a positive impact on tourist visitation but that the public, along with a subset of non-fishing boaters, had mixed to negative views on the presence of the turbines. Current opinion on the Ocean Wind project in New Jersey is quite divided as the general public and local leaders alike have expressed concerns on the impact to the viewshed and tourism. Taking all of this into account, this paper makes these policy recommendations: Engage stakeholders in a tourism/recreation-focused process to inform them of economic/viewshed related impacts, create tourist attractions and recreational activities related to the installation, build an observation deck to view the turbines but avoid visibility from ground level, account for all avoidable impacts to recreation (i.e. properly bury transmission cables).

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1. Introduction

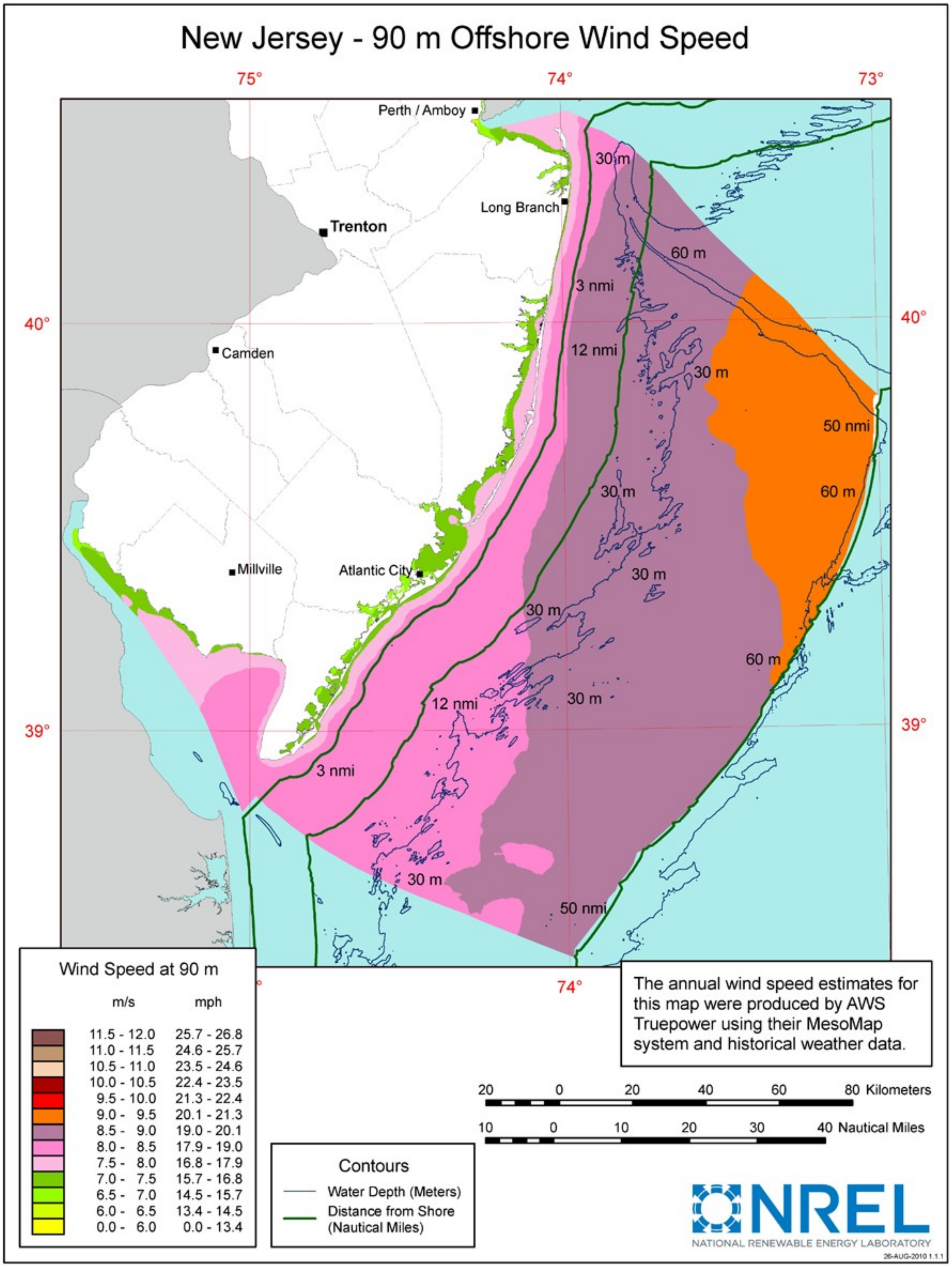
Over the last decade, the consensus on climate change and our role in it through the emission of greenhouse gases has only strengthened. Nations around the world have begun developing renewable energies such as solar and wind to decrease their dependence on fossil fuels. In the U.S., a burgeoning area of renewables is offshore wind power. In fact, according to BVG Associates, more than 40 GW of offshore wind capacity is expected to be installed off the U.S. East Coast by 2035. Additionally, the industry could invest up to $140 billion to establish and build out its supply chain, install equipment, and operate wind farms (Buljan, 2021). The focus area of this paper will be to analyze the current and potential wind development plans off the New Jersey coast from an economic and social impact lens. Based on the latest policy actions (Ramboll, 2020), it is clear that wind energy is a field with great potential and is likely to rapidly develop off the coast of New Jersey in the coming decades. In order for development to be a success for one of the State's important industries, making well-informed decisions on project planning areas is paramount. With this in mind, my research question is What impact will offshore wind energy development have on New Jersey's tourism industry? How might public opinion shift from pre-construction to post construction? In answering this question, the analysis will consider a variety of stakeholder perspectives from tourism-heavy areas with offshore wind build-outs. In addition, this paper will examine New Jersey-focused research that has already been carried out, while applying research that has been done in locations in the United States and United Kingdom that already have experience with building off-shore projects in tourism and recreation-heavy areas. Through the use of example Wind Turbine Generator (WTG) build-outs, the paper will demonstrate how New Jersey can use the experiences of other tourist-heavy locations to inform policy direction.

2. Background

2.1 Offshore Wind Potential

As New Jersey increasingly switches to renewable energy over the next decade, propelled by an ambitious Renewable Portfolio Standard (RPS) that requires 50% of the energy sold in state to come from qualifying energy sources by 2030 (NJDEP, 2020), the focus will turn to sources such as solar and wind. The Transition Incentive Program, created in late 2019, serves as a mechanism to implement the projects necessary to fulfill this goal. While New Jersey is the most densely populated state in U.S., much of the highest density areas are located in the northeastern portion of the state. There is a lot of open, flat land in southern New Jersey on which solar panels have already been erected in recent years. However, the largest renewable resource available to New Jersey is its persistent wind, specifically in the coastal area and off the coast (New Jersey - State Energy Profile Analysis, 2020). The offshore area is especially fruitful in this manner, with the average annual wind at 90 meters ranging from about 17 to 21 mph (AWS Truepower). Areas with annual average wind speeds of about 16 miles per hour and greater at 90-m height are generally considered to be suitable for offshore development (WINDExchange, n.d.).

Figure 1.


New Jersey - 90 m Offshore Wind Speed
75°
74°
73°
40°
39°
Perth / Amboy
Long Branch
Trenton
Camden
Millville
Atlantic City
30 m
60 m
3 nmi
12 nmi
50 nmi
Wind Speed at 90 m
m/s
mph
11.5 - 12.0 25.7 - 26.8
11.0 - 11.5 24.6 - 25.7
10.5 - 11.0 23.5 - 24.6
10.0 - 10.5 22.4 - 23.5
9.5 - 10.0 21.3 - 22.4
9.0 - 9.5 20.1 - 21.3
8.5 - 9.0 19.0 - 20.1
8.0 - 8.5 17.9 - 19.0
7.5 - 8.0 16.8 - 17.9
7.0 - 7.5 15.7 - 16.8
6.5 - 7.0 14.5 - 15.7
6.0 - 6.5 13.4 - 14.5
0.0 - 6.0 0.0 - 13.4
Contours
Water Depth (Meters)
Distance from Shore (Nautical Miles)
The annual wind speed estimates for this map were produced by AWS Truepower using their MesoMap system and historical weather data.
20 0 20 40 60 80 Kilometers
10 0 10 20 30 40 Nautical Miles
NREL
NATIONAL RENEWABLE ENERGY LABORATORY
26-AUG-2010 1.1.1

2.2 Offshore Wind Policy in New Jersey

In December 2018, the New Jersey Board of Public Utilities (NJBPU) unanimously voted to adopt a proposed rule establishing the Offshore Wind Renewable Energy Certificate (OREC) funding mechanism for the state's offshore wind energy (New Jersey BPU Okays OREC Funding Mechanism, 2018). The intent of which is to enable non-recourse financing of offshore wind projects that benefit New Jersey (New Jersey Board of Public Utilities, 2014). Essentially, the State is entitled to repayment only from the profits of the projects and not from any other assets of the borrower. To create this mechanism, the NJBPU was directed to establish an offshore wind renewable energy certificate (OREC) program. OREC requires a percentage of electric load be supplied by offshore wind to support at least 1,100 Megawatts (MW) of generation from qualified offshore wind facilities (Levitan & Associates, Inc., 2019). Furthermore, it was required that offshore wind projects deliver a net economic and environmental benefit to the State of New Jersey to receive ORECs. On September 17, 2018 the Board issued an order opening the application window to solicit the initial 1.1 GW of OSW capacity (Levitan & Associates, Inc., 2019). The Board reported on December 31, 2018, that applications from three developers were received in response to the solicitation (State of New Jersey Board of Public Utilities, 2018). These applications covered the baseline of 400 MW project size (Levitan & Associates, Inc., 2019). Applications for ORECs were received from three entities: Atlantic Shores Offshore Wind, Boardwalk Wind, and Ocean Wind. This paper will focus on the planning area of the Ocean Wind project.

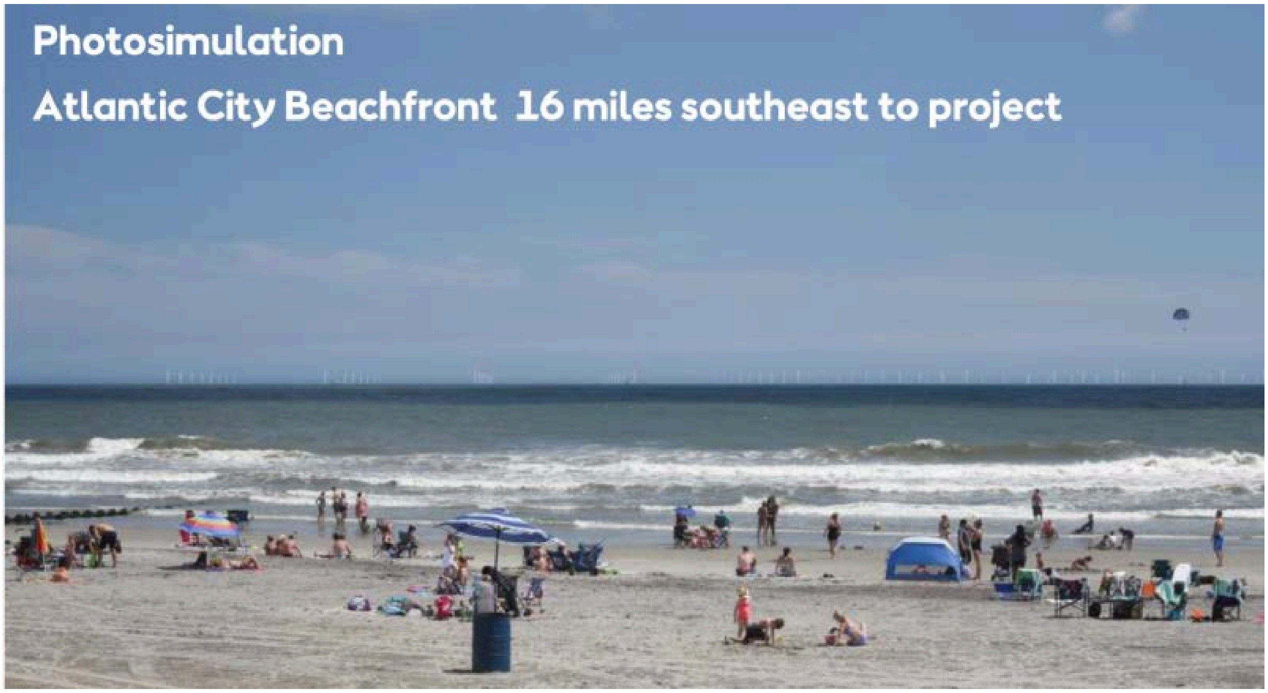
2.3 Tourism in Southern New Jersey

New Jersey is a coastal state that not only attracts tourism to its shores from interior parts of the state, but from other states such as New York, Pennsylvania, and Delaware. Some of its important draws include boardwalks, casinos, theme parks, boating/boat tours (ex. Dolphin tours), and the beaches along with the many recreational activities one can take part in the back bays. New Jersey's tourist economy is highly important to the state. Visitors to New Jersey spent $46.4 billion across a wide range of sectors in 2019. Direct GDP (gross domestic product) attributable to tourism spending totaled $21 billion, representing 3.2% of the state economy (Tourism Economics, 2020). A large part of tourism in New Jersey is driven by visitors to its 130 miles of coastline (New Jersey Business & Industry Association, 2017), especially in recent years. In 2019, there was strong visitor spending growth in Atlantic County, which, after ranking second in 2018, ranked 1st in 2019, with visitor spending increasing 5.3% (Tourism Economics, 2020). Some of this increase lends itself to the fact that 2019 was the first full year of operations of the two new casinos in Atlantic City. The shore counties did well in general, with both Ocean and Cape May County registering visitor spending growth of over 4% and Monmouth County ranked just behind Ocean County (Tourism Economics, 2020). In a survey from 2016, it was found that Atlantic, Cape May, and Ocean counties have the most employees impacted by tourism, with more than 100,000 of New Jersey's 321,231 direct tourism jobs. Furthermore, tourism also impacts a sizable direct share of total employment in these counties. In Atlantic, Cape May, and Ocean counties, direct impact tourism accounts for 29.1%, 43.6%, and 10.5% of total employment, respectively (New Jersey Business & Industry Association, 2017). Recreational fishing and beach visitation are the most pressing tourism-related issues when it comes to offshore wind in New Jersey. According to the Nation Marine Fisheries Service, there are approximately 175,000 registered marine vessels in New Jersey and over 1.2 million anglers fish New Jersey's marine waters each year (Recreational Fishing and Boating, n.d.). In terms of beachgoers (as in, people that specifically visit the beach), a survey from the July 4th weekend of 2019 found that between 100,000 and 200,000 people packed into Monmouth and Ocean County beaches (Petenko, 2019). This survey did not include ride, restaurants, or parking lots. In terms of tourist attractions directly related to renewable energy, the Atlantic County Utilities Authority (ACUA) offers a tour of their wastewater treatment facility, wind farm, solar project (Tour 2 – ACUA Wastewater Treatment Facility, Wind Farm, Solar Project, n.d.).

2.4 Current Public Opinion on Impact to Tourism Industry

As offshore wind is an emerging and rapidly-approaching reality for the residents of New Jersey, there have been some concerns voiced about its potential impact on the tourism industry on which many make their living, and everyone benefits. As the infrastructure is put in place for the construction of the turbines and the Bureau of Ocean Energy Management (BOEM) prepares for an environmental review of the Ocean Wind project, many in resort towns are taking notice. For example, Beach Haven, NJ, Mayor Colleen Lambert has publicly express concern about the impact on tourism and wants New Jersey to consider a similar policy as New York with an 18-mile minimum to prevent visual objections (Moore, 2021).

Figure 2. A visual simulation of what the Ocean Wind turbines would look like from the beach at Atlantic City, N.J. Ørsted image.



The above photostimulation shows that the turbines would be visible from shore on a clear summer day. This is expected since each turbine will be 850 feet tall (Ørsted, 2019). For comparison, that is over 100 feet taller than the tallest building in Atlantic City (Tallest buildings in Atlantic City, n.d.). In response to the visibility of the turbines, there has been a campaign called "Go Green and Unseen" that advocates for the planned WTGs to be moved from 15 miles to 35 miles off the coast, where they would not be seen (Nark, 2021). Many of the people affiliated with this movement are simply against the installation of the project due to a range of perceived impacts ranging from interference with bird migration to disruption of marine life due electromagnetic fields generated by the turbines. Others have been vocal about the visual disturbance of the horizon as viewed from the beach. On the other side of the issue, the Sierra Club's New Jersey chapter has been welcoming of the project as the group sees many positives from the WTGs. These positives mainly involve decreases in pollution, but the group also believes that sightseeing tours and recreational anglers will boost tourism.

3. Methodology

The first part of the analysis process will be to look at current studies of the potential impacts on beach visitation from the installation of WTGs off the coast of southern New Jersey (SNJ). There has been one large study, since the arrival of offshore wind in New Jersey (specifically off the SNJ coast where the Ocean Wind project is being planned) has been anticipated for over a decade. However, since there are currently no WTG buildouts in this area, no quantitative data sets exist to compare pre and post-construction beach visitation/recreational use.

While offshore wind is an emerging area in the United States, the number of buildouts and power generation is significantly behind many European countries (such as the UK, Denmark, Germany, Netherlands, and Belgium). Given these factors, a multi-faceted analysis is required. While there is a very limited data set to draw from in the U.S. (in fact, there is only one utility-scale facility in operation), there are many in operation off the European coast, mainly from the English Channel to the North Sea, with several installations in the Irish Sea as well. Therefore, most of the information about the negative or positive externalities from WTG buildouts as they related to recreation and tourism will come from European studies. The data used in this analysis will be from the large offshore energy-focused 4COffshore's global interactive map and data portal. This paper will focus on the Rampion Offshore Wind Farm, as the local recreation is similar to that of SNJ since it is one of the southern-most projects in Europe. In addition, the use of the project as a tourist attraction in and of itself is a potentially applicable use for SNJ's Ocean Wind buildout. The other facility this paper will focus on is the Rhode Island-based Block Island

Offshore Wind Farm. In addition to being those mentioned above only operational utility-scale buildout in the U.S., there has been a significant number of studies done regarding its impact on tourism, since the facility is located easily within viewing distance of the shore.

Through a combination of this information, the goal is to analyze the impact of utility scale offshore wind projects on tourism potential and make policy recommendation on how to maximize the benefits for SNJ's tourism/recreational economy.

4. Analysis

4.1 Projected Impacts of Offshore on New Jersey Tourism

There has been one major study that has specifically projected impacts to the New Jersey tourism industry. Released in 2008 and prepared by Global Insight Travel & Tourism, the report assesses costs and benefits from a previously planned 288-MW offshore wind project. Some general findings from this study include that the offshore wind farm is likely to reduce electricity prices and that greenhouse gas emissions could drop by 430,000 metric tons (measured by CO2 emissions) annually.

The report considered three different scenarios of distance from shore: three, six, and twenty miles. Based on the findings of the *New Jersey Shore Opinion Study About Off Shore Wind Turbines* and *New Jersey's Tourism Satellite Account*, a wind farm located three miles offshore could have net tourism sales impacts of $474 million in Atlantic County, and $155 million in Ocean and Cape May counties in 2012. These values were calculated by adding the tourism spending loss and tourism spending gain. The net present value (NPV) cost of a potential wind farm three miles off the coast would be $771 million in Atlantic County and $260 million in Ocean and Cape May Counties. At the other end of the spectrum, the impact of a potential wind farm located twenty miles off the coast of each county could be positive, compared to the no wind farm scenario, in Atlantic and Cape May. Both would see a NPV tourism sales gain of around $25 million over the operational lifetime of the wind farm. Ocean County's NPV difference would drop to $90 million. In terms of public opinion, 66% of respondents that mentioned a disadvantage to the wind turbine project, 32% of the total mentioned the impact of the wind farm on the ocean view. This ranged from a high of 45% of all respondents who mentioned view issues at 3 miles to a low of 20% of respondents at 20 miles.

4.2 Categorizing Offshore Wind Farm Size

The first step in determining offshore wind turbine impact on the tourism industry is categorizing wind farm size. Before analyzing the impact of a hypothetical wind farm on the tourism industry of New Jersey, one must consider the size of the proposed project. This could involve the number of turbines or the size of each turbine, or a combination of both. In the United States, there is a single utility scale, five-turbine, 30 MW project about 4 miles off the coast of Block Island (Trandafir). While there are no large-scale projects currently in operation in the US, there are many proposed projects and examples to consider off the European coastline.

4.3 Visibility from Shore

The second main factor considered in this study is the distance of the turbines from the shore. This, combined with the size of the turbines, is the main factor when it comes to determining whether or not a project will be visible from the shore. A study conducted in the United Kingdom looked at identifying the maximum distances the facilities could be seen in both daytime and nighttime views and assessing the effect of distance on visual contrasts associated with the facilities. Results showed that small to moderately sized facilities were visible to the unaided eye at distances greater than 42 km (26 mi), with turbine blade movement visible up to 39 km (24 mi). However, these are only visible to keen observers, turbines at this distance would likely not be seen by casual observers. At night, aerial hazard navigation lighting was visible at distances greater than 39 km (24 mi). The observed wind facilities were judged to be a major focus of visual attention at distances up to 16 km (10 mi), were noticeable to casual observers at distances of almost 29 km (18 mi), and were visible with concentrated viewing at distances beyond 40 km (25 mi) (Sullivan, Kirchler, Cothren and Winters, 2013). The extended distances at which turbines were observed in this study compared to traditional limits of 12-15 miles are due to their increasing size. Even this study from 2013 is outdated in terms of the maximum height considered (about 600 feet), as the height of the turbines in the proposed Ocean Wind will be about 850 feet.

Below is a scenario matrix of the type of projects that will be considered from case studies that will be used. Since many of the projects that make up this data set are in the approval phase, completed projects off the European coast will be used to study the real-world impacts of offshore wind on the tourism industry. However, there is still some literature on the expected impacts of the proposed projects, including the Ocean Wind project off the southern New Jersey coast, which will focus on this analysis.

4.4 Establishing Categories

Table 1: Establishing Project Distance

Project Name	Phase	Distance from Shore (miles)
Vineyard Wind 1	Consent Application Submitted	15
Park City Wind	Consent Application Submitted	23
Bay State Wind	Consent Application Submitted	25, 15
Revolution Wind	Consent Application Submitted	15, 32, 12
South Fork	Consent Application Submitted	35
Block Island	Fully Commissioned	3
Empire Wind	Consent Application Submitted	20
Ocean Wind	Consent Application Submitted	15
Skipjack	Consent Application Submitted	19
US Wind Maryland	Consent Application Submitted	17
Virginia Dominion	Consent Application Submitted	27
Kitty Hawk Wind	Consent Application Submitted	27

Statistic	Value (miles)
Range	32
Average	20
Median	19
Geometric Mean	17.8
Near Classification	18≥
Far Classification	18<

Note: Sorted for projects in the phase range from "Consent Application Submitted" to "Fully Commissioned" on the 4COffshore interactive map.

US Projects and Distance:

Vineyard Wind 1 (Consent Application Submitted): 15 miles
Source: Vineyard Wind

Park City Wind (Consent Application Submitted): 23 miles
Source: Vineyard Wind

Bay State Wind (Consent Application Submitted): 25 miles off south coast of Mass and 15 miles off the coast of Martha's Vineyard

Source: Ørsted and Eversource

Revolution Wind (Consent application submitted): 15 miles south of the Rhode Island coast, 32 miles southeast of the Connecticut coast, and 12 miles southwest of Martha's Vineyard
Source: Ørsted and Eversource

South Fork (Consent application submitted): 35 miles east of Montauk Point
Source: Ørsted and Eversource

Block Island (Fully Commissioned): 3 miles southeast of Block Island, RI
Source: Ørsted

Empire Wind (Consent application submitted): 20 miles south of Long Island, east of the Rockaways
Source: Equinor

Ocean Wind (consent application submitted): 15 miles off coast of southern NJ
Source: Ørsted and PSEG

Skipjack (consent application submitted): 19 miles off the Delmarva coast
Source: Ørsted

US Wind Maryland (consent application submitted): 17 miles off the coast of Ocean City
Source: US Wind

Virginia Dominion (consent application submitted): 27 miles off the coast of Virginia Beach
Source: Dominion Energy

Kitty Hawk Wind (consent application submitted): 27 miles off the coast of Outer Banks
Source: Avangrid Renewables

Range: 32 miles
Average: 20 miles
Median: 19 miles
Geometric Mean: 17.8 miles
Near = 18 miles and under
Far = Over 18 miles

Table 2: Establishing Project Size

Project Name	Number of Wind Turbine Generators	Capacity (MW)
Vineyard Wind 1	62	804
Park City Wind	Unk	804
Bay State Wind	110	2000
Revolution Wind	88	704
South Fork	15	130
Block Island	5	30
Empire Wind	70	816
Ocean Wind	90	1100
Skipjack	10	120
US Wind Maryland	32	268
Virginia Dominion	61	880
Kitty Hawk Wind	60	800

Statistic	Value (Number of WTGs)
Range	105
Average	54
Median	61
Geometric Mean	39
Small Classification	39≥
Large Classification	39<

Vineyard Wind 1: 62 WTGs, 804 MW

Park City Wind: 804 MW (number of WTGs not specified, most likely similar to Vineyard Wind 1)

Bay State Wind: up to 110 WTGs, 2000 MW

Revolution Wind: 88 WTGs, 704 MW

South Fork: 15 WTGs, 130 MW

Block Island: 5 WTGs, 30 MW

Empire Wind: 60-80 WTGs, 816 MW

Ocean Wind: 83-98 WTGs, 1100 MW

Skipjack: 10 WTGs, 120 MW

US Wind Maryland: 32 WTGs, 268 MW

Virginia Dominion: 59-63 WTGs, 880 MW

Kitty Hawk Wind: 60 WTGs, 800 MW

Range: 105 WTGs
Average: 54
Median: 61
Geometric Mean: 39
Small: less than or equal to 39
Large: greater than 39

4.5 Example of Small/Near Implementation: Block Island

Located about 3 miles southeast of Block Island, Rhode Island, with just 5 turbines generating at a capacity of 30 MW, the first utility-scale WTG project is a prime example of a near to shore and small implementation. The project went into operation in 2016. In a pre-project Environmental Report put together by Deepwater Wind, marine recreational activities such as boating, sailing, diving, and wildlife viewing, as well as seaside travel destinations and shore-based activities such as surfing or beachgoing, were discussed as core pieces of Rhode Island tourism. Block Island also hosts many buoy sailboat races during the annual Block Island Race Week (Tetra Tech, 2012). In fact, the importance of tourism to Rhode Island is even more pronounced than it is for New Jersey. According to the RI Ocean SAMP, tourism and hospitality is Rhode Island's fourth-largest industry based on employment, contributing $6.8 billion in spending and generating 12 percent of all state and local tax revenue in 2007 (Tetra Tech, 2012).

Figure 3. General project layout with WTGs indicated within the green box (project area).

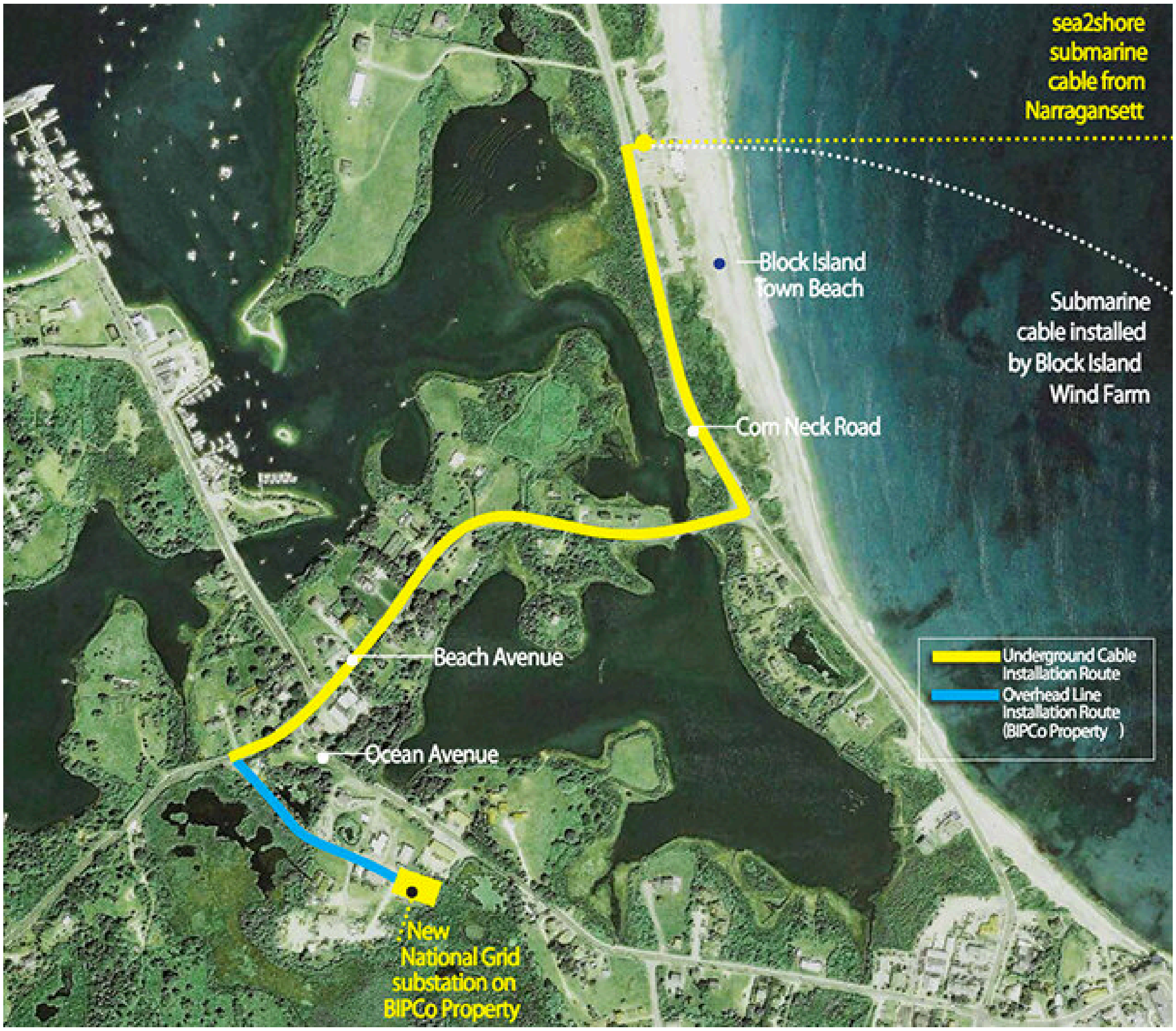
Outside the minor, localized, and short-term impacts involved with installing the WTGs, no navigation exclusion areas were expected to be implemented for any vessels. Therefore, no adverse impacts on recreation and tourism were expected. The Tetra Tech report even predicted that the wind farm itself may become a tourist attraction, contributing additional revenues to state and local economies (Tetra Tech, 2012).

Surveys of post-construction opinions have been numerous since this is the first utility-scale example of an offshore wind project that researchers have analyzed. A survey of 263 US residents who have been to Block Island at least once from 2013 – 2018 did not find a significant negative impact of prior knowledge or views of the turbines on the average number of trips or Willingness to Pay (WTP) (Trandafir et al., 2020). Instead, respondents showed a positive attitude to the offshore wind turbines overall and their effects on specific recreational activity. The estimated average WTP is positive across all activities, suggesting that the overall enjoyment of the beach has improved with construction. Significantly, this study found positive effects of prior knowledge on WTP for beach locations with a view of the turbines (Trandafir et al., 2020). While this study certainly points to a positive outlook from the public on the presence of WTGs from before and after the installation of the project (with an increase from 2013 to 2018), additional hard indicators of vacationing are important. In a study that evaluated the impact of the project on tourism as measured by changes in local AirBnb rental market activity, results indicated that during the peak-tourism months of July and August following its construction, the project caused a seven-night increase in the number of nights reserved (Carr-Harris and Lang, 2019). While this study is limited to longer stays and doesn't capture single-day, short-term stays, and lodging accommodations made through other platforms, the sample size of 558 AirBnb rental properties and analysis of multiple July-August peaks allows it to supplement the Trandafir study well.

While out of state vacationers and beachgoers have had a positive outlook on the installation of the WTGs, the same cannot be said for recreational boaters. A study conducted by the University of Rhode Island on how offshore wind farms impact recreational boaters in and around RI coastal waters found that boating near an offshore wind farm (within 100 ft) will considerably detract from a boater's experience. In fact, boaters would be willing to pay to avoid wind farms indicating that recreational boating patterns will shift in areas with wind farm development (Dalton et al., 2020). This is in stark contrast with beachgoers, who were willing to pay to view the turbines, especially if they had prior knowledge of the turbines. However, it is important to point out that boaters that fish are more likely to respond positively to the turbines than boaters who do not fish, though neither would prefer the presence of turbines. While the Block Island project may have negligible effects on recreational boating/fishing, installation of larger projects such as Revolution Wind would likely cause more conflict with this community.

The most controversial outcome from the WTG installation from a beach perspective has been the periodic tendency for the onshore cable to become exposed at Crescent Beach. The problem has persisted since 2016. Subsurface bedrock and boulders, in addition to shifting sand, may be preventing the cables from staying buried at a mandated depth of 4-6 feet into the seafloor and making them prone to exposure (Faulkner, 2019). In May of 2018, National Grid deployed buoys to mark a no-anchor zone to warn boaters of the cables below. However, 3 months later, swimmers discovered the 34,500-volt cable some 25 feet offshore in shallow water at Crescent Beach (Faulkner, 2019).

Figure 4. Diagram of the onshore portion of the Block Island Wind Project (BIWP)



Source: https://www.ecori.org/

<u>4.6 Example of Large/Near Implementation: Rampion Offshore Wind Farm</u>

While there are a lot of large offshore wind installations off the coast of the United Kingdom, this one stands out as the only one implemented in the English Channel and therefore in relatively warm waters (temperatures range from 60-66F during the months of August and September) (Water temperature in Brighton now, n.d.). It is also located just 8 miles off the coast (4C Offshore, n.d.). In a pre-project scoping report, RSK Group, a large privately-owned environmental consultancy, noted the widespread and varied nature of recreational activities in the nearshore coastal area. These include bathing near the beach, wind- and kite- surfing, water and jet-skiing, motor-boating, yachting, diving, and recreational angling (RSK Environment Ltd (RSK), 2010). This list of uses contains a lot of overlap with the list of uses found in New Jersey. In terms of the impacts of the project on tourism, the typical construction impacts were cited in the report. More importantly and similar to Block Island, the RSK report discussed the proposed offshore wind farm in terms of a new tourist attraction once construction is completed, which could contribute to the local economy. This refers to the potential for existing or new businesses to offer short boat trips to enable tourists to see the wind farm close up. Even in 2010, EC&R's visitor centre for the Scroby Sands Wind Farm provided precedent as it attracted 35,000 visitors a year at that time (RSK Environment Ltd (RSK), 2010). However, the feasibility of such endeavors should be considered along with possible interference with other resource users. Some tourists may feel that the presence of an offshore wind farm blights the seascape, which may deter them from visiting the area.

In practicality the local community has been mostly supportive, though some opposition has come from rural areas outside Brighton, where cable was laid across the South Downs (O'Keefe, 2017).

Figure 5. General project layout

Otherwise, the effects on tourism have been positive. According to data from the British Tourist Authority, overnight visits to Brighton increased from 604,000 in 2017 to 615,000 in 2018, and then up again to 647,000 in 2019 (Ohleth, 2021). This may in part be due to the novelty of the wind farms and the fact that Brighton Diver offers tours of the wind farms (Tours from Brighton Marina, n.d.) or the opening of Rampion Offshore Wind Farm Visitor Centre at the Brighton seafront (Seager, 2020). Overall, this project has shown that even in seemingly difficult locations to build due to their pristine visuals, the local community can become accepting of the installations and even benefit from them.

5. Discussion

Although the sample size of installed WTG projects in areas that are heavily dependent on the tourism industry is small, there are some take-home messages for New Jersey.

1) Engaging Stakeholders: Going through the research process, the importance of stakeholder engagement has stood out. Whether it is from the state government or the bid-winning firm(s), there are a lot ofthe bid-winning firm(s). There are many diverging opinions inshore communities, especially due to the novelty and stark change involved with installing WTGs offshore. An example of stakeholder engagement in action on the part of Ørsted led to some design changes based on suggestions from local fishermen to increase the spacing between turbines to allow for easier navigation. However, the viewshed impacts that have been a point of contention from Ocean City to Atlantic City have yet to be fully addressed.
2) Distance from Shore: The 2008 study conducted by Global Insight Travel & Tourism indicated that there is a significant difference between locating a 288 MW wind farm three miles off the coast, and locating it 20 miles off the coast. A broader, more recent study of tourists conducted in 2020, while not focused on New Jersey specifically, agreed with this assessment: "At 2.5-miles offshore, 53% of the respondents report that their beach experience would be made somewhat worse or worse and 29% report that they would seek out another beach or do something else (most seeking out another ocean beach). At 20-miles offshore only 10% of the respondents report that their experience would be made somewhat worse or worse and only 5% report changing trip plans (Parsons, Firestone, Yan and Toussaint, 2020). This study was based on pictures of hypothetical wind turbines off the coast of various points along the eastern seaboard. As there is currently a strong push for the installation of large wind projects, it will be interesting to see how these opinions change

post-installation. Currently, there seems to be significant opposition from locals such that the installation of a project located within a major focus of visual attention (10 miles) would be unlikely.

3) Size of Project: While a project such as the one installed off Block Island (BIWF) may be only a few miles offshore, it is only composed of five turbines and therefore does not pose as big of a visual issue the nearly 100 turbine Ocean Wind project. Not only will the Ocean Wind project contain a significantly greater number of turbines, but each turbine will also stand roughly 250 feet higher than the Block Island turbines. This allows someone at the shore to be able to see the Ocean Wind installation despite the fact it will be 12 miles further from the coast than BWIF. An additional factor at play is the geographical and population difference. Block Island is almost an exclusive tourist destination that grows 11-fold (1,000 to 11,000 inhabitants) during the summer months while the shore points of SNJ have significantly more year-round residents due to the proximity to mainland of the barrier islands and more land area overall.

4) Change in Perception: The Rampion project off the coast of Brighton in the English Channel showed the ability for locals to warm up to the disturbance of a previously undisturbed view. However, it is important to point out that there may be some cultural differences at play, and this populations' general acceptance of a large project close to shore does not guarantee the same will be the case in New Jersey. In fact, there are currently quite a few local leaders in the potentially impacted areas of SNJ that have voiced criticism of the Ocean Wind project on a number of fronts. Impacts to recreation and tourism are among the most often cited issues of concern.

The next step in this research would be to conduct an online survey of northern Delaware, southeastern Pennsylvania, and New Jersey to gather data about how the public views offshore wind and its impact on beach visitation and other recreational activities. Key parameters to measure would be frequency of visitation to Atlantic, Ocean, and Cape May county beaches specifically, recreational activity engaged in, and prior knowledge of the Ocean Wind and/or Atlantic Shores projects.

6. Conclusion and Policy Recommendations

Based on the analysis carried out in this paper, it is likely that offshore wind has the potential to be a boon to the New Jersey tourist and recreational economy. However, this is contingent on public acceptance of the WTG projects, which largely involves year-round resident approval. Without proper adjustments to account for the needs of the stakeholders and outlining of the benefits to the local economy, a large-scale wind project such as Ocean Wind will struggle to reach the installation phase. While the U.S.-based project (BIWF) analyzed in this paper is only three miles from shore and is therefore visible to the public, it is a much smaller project with just five turbines compared to nearly 100 projected for Ocean Wind. In addition, the constituency is significantly different in size. For perspective, Block Island's year-round population is about 1,000 while Atlantic City alone contains about 38,000 residents, with several other large shore towns in Atlantic and Cape May counties to consider. This leads to a wider range of interests and local voices of concern that could slow the approval process. Based on current trends, it is possible that this could occur. While recreation (most importantly, fishing) and tourism are not always specifically referenced in concerns about viewshed concerns, they are implicit in any discussions. Basically, residents are open to WTGs as long as they cannot see them. From research conducted in the United Kingdom, the turbines would likely have to be located at least 25 miles from the coast for this to be the case. However, due to the increased size of the turbines, they may still be somewhat visible on clear days. While there is a small sample size of locations that have installed WTGs within view of the shore in a tourist-heavy coastal region, the short-term results have shown an increase in visitation to these areas. In fact, New Shoreham has seen increases in AirBnB rentals that have sustained for multiple peak cycles of the tourism season (July/August) since the installation of the WTGs. However, the recreational boating community, particularly the part that does not fish, did not have as nearly a positive response. On the flip side, the recreational fishing community was more open to the installation due to the likelihood thatas more open installation because artificial reefs will form and attract more fish. An issue that has arisen at this facility has also been the tendency for the undersea transmission cable to re-surface, even in near-shore areas used for swimming. This has made for consistently negative press in New Shoreham and is an issue the State must strongly consider in the installation of Ocean Wind. In the case of BIWF, the burying of a cable at too shallow a depth was caused using the quicker but incorrect process to create the trench (Faulkner, 2020). Since Ørsted was involved with this gaff and has been awarded the bid to develop Ocean Wind, they must learn from this situation and use the recommended process to bury the cable such that it will not surface properly. In addition to the two case studies discussed in this paper, there have been well-documented cases of offshore wind and the tourism industry coming into direct opposition in the Netherlands, Estonia, and Germany.

Recommendations:

1) Engage stakeholders in a tourism/recreation-focused process to inform them of economic/viewshed related impacts. It is important to capture as large a cross section of recreation/tourism-related stakeholders as possible over as many shore towns as possible. These could include fishing and non-fishing boaters, beachgoers, etc. An interactive manner to conduct this process would be to create an open source database where anyone could add recreational sites or routes, such as areas where they go to kayak, surf, or watch nature (Tourism and Offshore Wind 2021). This would allow policy makers to discern the most important tourism and recreation areas directly from the stakeholders in a data format. Testimonies from other shore towns with offshore wind installations could be helpful.
2) Create tourist attractions related to WTG installation. This should include information about the facility (aka operation of wind turbines and the facility as a whole, what is being done to maintain the facility), dependency of wind power, decreases in CO2 emissions due to wind power, etc. Boat tours of the turbines should be offered to provide tourists an up and close look at the 850 foot-high turbines. Additional tourism opportunities could involve offshore wind farms functioning as an artificial reef for divers and facilities for tourists who may want to engage in recreational fishing close to turbines.
3) Ideally, wind turbines would be viewable from the observation deck but not from ground level to provide flexibility for those that want to view the turbines or do not want to view them.

4) Account for all avoidable impacts to recreation (i.e. proper burial of transmission cable). Additional weather-related marine advisories warning boats and other craft to avoid the turbine area could also be helpful in this category.

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